

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A magnetic element comprising:
 - a pinned layer, the pinned layer being ferromagnetic and having a first magnetization;
 - a current confined layer having at least one channel in an insulating matrix, the at least one channel being conductive and extending through the current confined layer; and
 - a free layer, the free layer being ferromagnetic and having a second magnetization, the current confined layer residing between the pinned layer and the free layer and being adjacent to the pinned layer and the free layer;wherein the pinned layer, the free layer, and the current confined layer are configured to allow the second magnetization of the free layer to be switched using spin transfer.
2. (Original) The magnetic element of claim 1 wherein the at least one channel has a diameter of between one and three nanometers.
3. (Original) The magnetic element of claim 1 wherein the magnetic element further includes:
 - a second pinned layer being ferromagnetic and having a third magnetization;
 - a nonmagnetic spacer layer residing between the free layer and the second pinned layer.

4. (Original) The magnetic element of claim 3 wherein the nonmagnetic spacer layer includes a second current confined layer.

5. (Original) The magnetic element of claim 3 wherein the nonmagnetic spacer layer includes a barrier layer, the barrier layer being insulating and having a thickness that allows tunneling of current carriers between the free layer and the second pinned layer.

6. (Original) The magnetic element of claim 3 wherein the nonmagnetic spacer layer includes a conducting layer.

7. (Original) The magnetic element of claim 1 wherein the free layer is a synthetic free layer including a first ferromagnetic layer and a second ferromagnetic layer separated by a nonmagnetic layer.

8. (Currently Amended) ~~The magnetic element of claim 1 wherein the current confined layer further includes: A magnetic element comprising:~~

a pinned layer, the pinned layer being ferromagnetic and having a first magnetization;
a current confined layer having at least one channel in an insulating matrix, the at least one channel being conductive and extending through the current confined layer; and
a free layer, the free layer being ferromagnetic and having a second magnetization, the current confined layer residing between the pinned layer and the free layer;
wherein the pinned layer, the free layer, and the current confined layer are configured to allow the second magnetization of the free layer to be switched using spin transfer;

a first conductive layer disposed between the free layer and the current confined layer;
and

a second conductive layer disposed between the pinned layer and the current confined
layer.

9. (Original) A magnetic element comprising:

a first pinned layer, the first pinned layer being ferromagnetic and having a first
magnetization;

a current confined layer having at least one channel in an insulating matrix, the at least
one channel being conductive and extending through the current confined layer; and

a first free layer, the first free layer being ferromagnetic and having a second
magnetization, the current confined layer residing between the first pinned layer and the first free
layer; and

a spin tunneling junction having a second free layer, a second pinned layer and a barrier
layer residing between the second free layer and the second pinned layer, the barrier layer being
insulating and having a thickness that allows tunneling of current carriers between the second
free layer and the second pinned layer, the second free layer and the first free layer being
magnetostatically coupled;

wherein the first pinned layer, the first free layer, and the current confined layer are
configured to allow the second magnetization of the first free layer to be switched using spin
transfer.

10. (Original) The magnetic element of claim 9 wherein the at least one channel has a diameter of between one and three nanometers.

11. (Original) The magnetic element of claim 9 further comprising:
a separation layer between the first free layer and the second free layer, the separation layer for insuring that the first free layer and the second free layer are magnetostatically coupled.

12. (Original) The magnetic element of claim 9 wherein the spin tunneling junction is a dual spin tunneling junction having a third pinned layer and a second barrier layer residing between the third pinned layer and the second free layer, the third pinned layer being ferromagnetic.

13. (Original) The magnetic element of claim 12 further comprising:
a fourth pinned layer; and
a nonmagnetic spacer layer, the nonmagnetic spacer layer residing between the first free layer and the fourth pinned layer, the second free layer and the first free layer being spaced apart such that the first free layer and the second free layer are antiferromagnetically coupled.

14. (Original) The magnetic element of claim 9 wherein the magnetic element is shaped such that the first free layer has a first width and the second free layer has a second width, the second width being greater than the first width.

15. (Original) The magnetic element of claim 9 wherein the current confined layer further includes:

a first conductive layer disposed between the first free layer and the current confined layer; and

a second conductive layer disposed between the first pinned layer and the current confined layer.

16. (Original) A magnetic element comprising:

a first pinned layer, the first pinned layer being ferromagnetic and having a first magnetization;

a current confined layer having at least one channel in an insulating matrix, the at least one channel being conductive and extending through the current confined layer; and

a first free layer, the first free layer being ferromagnetic and having a second magnetization, the current confined layer residing between the first pinned layer and the free layer; and

a spin valve having a second free layer, a second pinned layer and a nonmagnetic spacer layer residing between the second free layer and the second pinned layer;

wherein the first pinned layer, the first free layer, and the current confined layer are configured to allow the second magnetization of the first free layer to be switched using spin transfer.

17. (Original) The magnetic element of claim 16 wherein the nonmagnetic spacer layer is a second current confined layer having at least a second channel in a second insulating matrix,

the at least the second channel being conductive and extending through the second current confined layer.

18. (Original) The magnetic element of claim 16 further comprising:
a separation layer between the first free layer and the second free layer, the separation layer for insuring that the first free layer and the second free layer are magnetostatically coupled.

19. (Original) The magnetic element of claim 16 wherein the spin valve is a dual spin valve having a third pinned layer and a second nonmagnetic spacer layer residing between the third pinned layer and the second free layer, the third pinned layer being ferromagnetic.

20. (Original) The magnetic element of claim 19 further comprising:
a fourth pinned layer; and
a second nonmagnetic spacer layer, the second nonmagnetic spacer layer residing between the first free layer and the fourth pinned layer, the second free layer and the first free layer being spaced apart such that the first free layer and the second free layer are antiferromagnetically coupled.

21. (Original) The magnetic element of claim 20 wherein the second nonmagnetic spacer layer includes a second current confined layer having at least a second channel in a second insulating matrix, the at least the second channel being conductive and extending through the second current confined layer.

22. (Original) The magnetic element of claim 20 wherein the current confined layer further includes:

a first conductive layer disposed between the first free layer and the current confined layer; and

a second conductive layer disposed between the first pinned layer and the current confined layer.

23. (Currently Amended) The magnetic element of claim 16 wherein at least one channel has a diameter of between one and three nanometers.

24. (Original) A magnetic element comprising:
a first pinned layer, the first pinned layer being ferromagnetic and having a first magnetization;

a current confined layer having at least one channel in an insulating matrix, the at least one channel being conductive and extending through the current confined layer; and

a first free layer, the first free layer being ferromagnetic and having a second magnetization, the current confined layer residing between the first pinned layer and the first free layer; and

a dual spin valve/tunnel structure having a second pinned layer, a nonmagnetic spacer layer, a second free layer, a third pinned layer and a barrier layer residing between the second free layer and the third pinned layer, the barrier layer being insulating and having a thickness that allows tunneling of current carriers between the second free layer and the second pinned layer,

the nonmagnetic spacer residing between the second pinned layer and the second free layer, the second free layer and the first free layer being magnetostatically coupled;

wherein the first pinned layer, the first free layer, and the current confined layer are configured to allow the second magnetization of the free layer to be switched using spin transfer.

25. (Original) The magnetic element of claim 24 further comprising:

a separation layer between the first free layer and the second free layer, the separation layer for insuring that the first free layer and the second free layer are magnetostatically coupled.

26. (Original) The magnetic element of claim 25 further comprising:

a fourth pinned layer; and

a second nonmagnetic spacer layer, the second nonmagnetic spacer layer residing between the first free layer and the fourth pinned layer, the second free layer and the first free layer being spaced apart such that the first free layer and the second free layer are antiferromagnetically coupled.

27. (Original) The magnetic element of claim 26 wherein the second nonmagnetic spacer layer includes a second current confined layer having at least a second channel in a second insulating matrix, the at least the second channel being conductive and extending through the second current confined layer.

28. (Original) The magnetic element of claim 24 wherein the nonmagnetic spacer layer is a second current confined layer including at least a second channel in a second insulating

matrix, the at least the second channel being conductive and passing through the second current confined layer.

29. (Original) The magnetic element of claim 24 wherein the current confined layer further includes:

a first conductive layer disposed between the first free layer and the current confined layer; and

a second conductive layer disposed between the first pinned layer and the current confined layer.

30. (Original) The magnetic element of claim 24 wherein the at least one channel has a diameter of between one and three nanometers.

31-53. (Canceled)

54. (New) The magnetic element of claim 1 wherein the lateral dimension of the free layer is not more than two hundred nanometers.

55. (New) The magnetic element of claim 54 wherein the lateral dimension of the free layer is not more than one hundred nanometers.

56. (New) The magnetic element of claim 1 wherein the free layer has a thickness of five nanometers.

57. (New) The magnetic element of claim 1 wherein the free layer has a depth of fifty nanometers.